Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

DRAFT
Title V / Synthetic Minor, Operating
Permit: V-07-024 R1
Constellation Spirits Inc.
Bardstown, KY 40004
June 13, 2008
Lisa Beckham, Reviewer

SOURCE ID:	21-179-00020
AGENCY INTEREST:	3247
ACTIVITY:	APE20080002

SOURCE DESCRIPTION:

Constellation Spirits Inc. operates a distillery in Nelson County, Kentucky, where whiskey and bourbon are produced from grains through fermentation and distillation. Grain that has been milled is fed into mash cookers along with water where the grain starches are converted to sugars by heating. The cooked grain/water mixture is fed into fermenter vessels as a batch operation to convert the sugars to ethanol. After an appropriate residence time, the mixture is processed through distillation columns and condensers to separate the ethanol from the mixture. The condensed liquid is put into barrels to be aged. After the appropriate age is reached the bourbon or whiskey is dumped from the barrels, processed and bottled for shipping.

CURRENT PERMITTING ACTION: REVISION 1 - REMOVAL OF COAL USAGE LIMIT

On April 16, 2008 Constellation Spirits submitted an application for a significant revision to their Title V permit, V-07-024. Supplemental information was received on May 8, 2008 and June 10, 2008, respectively. On June 5, 2008 Constellation Spirits submitted an application for an administrative name change from Barton Brands, LTD to Constellation Spirits Inc. The name change has been incorporated into this permit revision.

In this revision, Constellation Spirits has proposed replacing the 15,000 ton per year limit on coal usage with a limit on the chlorine content of coal. The limit on coal usage was set based on the AP-42 emission factor for hydrogen chloride to preclude applicability of CAA Section 112(j). In October 2007 Constellation Spirits conducted stack testing on Emission Unit 09 (99.5 MMBtu/hr coal-fired boiler) to determine emissions of hydrogen chloride and particulate matter. The facility controls hydrogen chloride by injecting limestone into the combustion gases prior to entering the baghouse for Emission Unit 09. During the stack test, the hydrogen chloride emissions were determined at varying limestone feed rates (0 to 180 lb/hr). These results were then used to develop the polynomial equation below to estimate the control efficiency of hydrogen chloride, where x = the limestone feed rate:

$$\textit{Control Efficiency} = -2\times10^{-5}x^3 + .0058x^2 - .0331x + 30.963 \quad (R^2 = 0.9984)$$

The maximum chlorine content is set at 2,956 ppm (110% of the average chlorine content used during testing) and will be based on the monthly average chlorine content of coal burned.

Constellation Spirits will use this equation, the chloride content of the coal and the limestone feed rate to determine monthly hydrogen chloride emissions. Since the stack tests were conducted at or near the maximum heat input of the boiler, Constellation Spirits considers this method to be a conservative approach to estimating emissions, since the polynomial equation used does not take into account the heat input of the boiler. The 9.0 ton per year limit on hydrogen chloride emissions remains unchanged and the facility shall maintain a log of the twelve-month rolling total for review by the Division. All 502(b)10/off permit changes have also been incorporated into this permit revision.

PAST PERMITTING ACTION: TITLE V RENEWAL

On October 19, 2004 Barton Brands, Ltd submitted an application for the renewal of their Title V permit, V-00-001. Supplemental information was received on February 26, 2006 and April 30, 2007, respectively. The facility proposes a 15,000 tons per year limit on coal usage to preclude applicability of Section 112(j) of the Clean Air Act, due to emissions of hydrogen chloride. The Division concurs that Barton Brands may use the emission factor from the most current AP-42 value for the hydrogen chloride emissions until new information is gathered from the compliance test that shall be performed within six months of issuance of the permit. Emission factors derived from compliance testing are to replace the emission factor currently listed in the permit, and shall be used to calculate future emissions. Additionally, source emissions of hazardous air pollutants (HAPs) shall be limited to 9.0 tons per year of a single HAP and 22.5 tons per year for the total HAPs.

The source-wide emission limit on SO_2 has been changed from 249 tons per year to 225 tons per year. The 249-ton per year limit gives very little room for error and is not practical without some additional monitoring requirements. Should Barton Brands' production increase such that the potential to emit would be greater than 225 but less than 250 tons per year Barton may request a higher limit. Any increase in the potential above 225 tons per year would require more stringent monitoring requirements.

The facility is in the process of installing a baghouse with lime injection on Emission Unit 09. The baghouse will reduce emission of particulates and acid gases from the facility. Several emissions factors were updated for the Emissions Inventory System, which warranted reclassification of the convey elevator (previously part of Emission Unit 01) and the rotary dryers (previously part of Emission Unit 04) to be considered as insignificant activities. Ash and lime silos were added to the list of insignificant activities as well.

COMMENTS:

Applicable Regulations:

401 KAR 63:010, Fugitive emissions, applicable to each affected facility which emits or may emit fugitive emissions and is not elsewhere subject to an opacity standard within the administrative regulations of the Division for Air Quality, applies to EU 01

401 KAR 61:020, Existing process operations, applicable to an emission unit that commenced prior to July 2, 1975, applies to EU 02 and EU 04

401 KAR 59:015, New indirect heat exchangers for affected facilities with a heat input capacity of 250 MMBtu/hr or less and commenced on or after April 9, 1975, applies to EU 07 and 08

401 KAR 60:005, incorporating by reference 40 CFR 60, Subpart Dc, Standards of performance for small industrial-commercial-institutional steam generating units, applies to each steam generating unit commenced after June 9, 1989 that has a maximum design heat input capacity between 10 MMBtu/hr and 100MMBtu/hr, applies to EU 07 and EU 08

401 KAR 61:015, Existing indirect heat exchangers, applicable to an emissions unit with a capacity of less than 250 MMBtu/hr which commenced before April 9, 1972, applies to EU 09

40 CFR Part 64, Compliance Assurance Monitoring (CAM), applies to EU 09

Non-Applicable Regulations:

401 KAR 51:017, Prevention of Significant Deterioration of Air Quality. Permittee has elected to accept voluntary federally enforceable operating and emission limitations to preclude applicability of these standards.

CAA Section 112(j). Permittee has elected to accept voluntary federally enforceable operating and emission limitations to preclude applicability of these standards.

Emission Unit 01 (01001-01002) Grain Handling Operations

Grain is delivered by truck and unloaded onto grates into underground hoppers. Grain is then conveyed via screw conveyor and enclosed bucket elevator to the grain cleaner. This unit can process about 40 tons/hr and is a source of fugitive emissions. Reasonable precautions shall be taken to prevent particulate matter from becoming airborne from this unit.

Pursuant to 401 KAR 63:010, Section 3, discharge of fugitive dust emissions beyond the property line is prohibited

Emission Unit 02 (01003) Grain Cleaning and Emission Unit 04 (03003) Rotary Dryers and Cyclone Separator

Emission Unit 02:

Grain that is received is sent to the grain cleaner (01003), a shaker screen, which separates the grain before is it fed to the hammermill. A baghouse is used to control PM emissions from this unit. This unit can process 40 tons/hr.

Emission Unit 04:

Three steam rotary dryers (03002) are used to dry spent stillage at a rate of 2.5 tons/hr, which becomes known as distillers dried grain (DDG). The DDG is then fed to a cyclone separator (03003), which operates at 2.5 tons/hr, before being stored in the DDG silo.

Pursuant to 401 KAR 61:020, Section 3(2)(a), particulate emissions from each unit into the open air shall not exceed $[4.10(P)^{0.67}]$ pounds per hour based on a three-hour average where P is the monthly average processing rate in tons per hour. If the process rate weight is 1,000 lbs/hr or less than the limit on particulate matter emissions is 2.58 lbs/hr.

Pursuant to 401 KAR 61:020, Section 3(1)(a), visible emission from each unit shall not equal or exceed forty (40) percent opacity based on a six-minute average.

Pursuant to 401 KAR 52:020, Section 26, the permittee shall perform a qualitative visible

observation of the opacity of emissions from each stack on a weekly basis and maintain a log of the observation. If visible emission from a stack are seen, then the opacity shall be determined using EPA Reference Method 9 and an inspection shall be initiated for any necessary repairs.

Emission Unit 07 and 08 (10001, 10003) **Indirect Heat Exchangers**

Two 40.4 MMBtu/hr boilers were installed in 1993. These units are fired by natural gas with No. 2 fuel oil as a backup fuel source. There are no control devices on these units.

Pursuant to 40 CFR 60.42c, the sulfur content of No. 2 fuel oil shall not exceed 0.5 percent by weight.

Pursuant to 401 KAR 59:015, Section 4(1)(c), particulate emissions from each unit's stack shall not exceed 0.28 lb/MMBtu based on a three-hour-average.

Pursuant to 40 CFR 60.43c (c), no operator or owner shall cause to be discharged into the atmosphere from that facility any gases that shall exhibit greater than twenty (20) percent opacity (6-minute average), except for one 6-minute period per hour of not more than twenty-seven (27) percent opacity.

Pursuant to 401 KAR 59:015, Section 4(2)(c), emissions shall not exceed twenty (20) percent opacity based on a six-minute average except during building a new fire for the period required to bring the boiler up to operating conditions provided the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendations.

Pursuant to 40 CFR 60.42c, sulfur dioxide emissions from each unit's stack shall not exceed 0.50 lb/MMBtu or, as an alternative, the permittee shall not combust oil that contains greater than 0.5 weight percent sulfur.

Emission Unit 09 (10002) **Indirect Heat Exchanger**

This is a 99.5 MMBtu/hr Vogt Spreader-stoker bituminous coal fired boiler with flyash reinjection and was installed in 1961. Particulate emissions are controlled by a baghouse (emission rate of 0.03 lb/MMBtu). Hydrogen chloride emissions are controlled by injecting limestone just prior to entering the baghouse. Since pre-control particulate emissions exceed 100 tons per year a CAM plan is required.

To preclude the applicability of CAA Section 112(j) source-wide usage rate of coal from all affected facilities shall not exceed 15,000 tons per year (12 month rolling total).

To preclude applicability of CAA Section 112(j), the chlorine content of the fuel burned shall not exceed 2956 ppm, by weight, on a monthly average.

Pursuant to 401 KAR 61:015, Section 4(1), particulate emissions shall not exceed 0.36 lb/MMBtu based on a three-hour average.

Pursuant to 401 KAR 61:015, Section 4(3)(b), visible emissions shall not exceed forty (40) percent opacity based on a six-minute average except that a maximum of sixty (60) percent opacity shall be permissible for not more than six (6) consecutive minutes in any sixty (60) consecutive minutes during cleaning the fire box or blowing soot.

Pursuant to 401 KAR 61:015, Section 4(3)(c), emissions shall not exceed twenty (40) percent opacity based on a six-minute average except during building a new fire for the period required to bring the boiler up to operating conditions provided the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendations.

Pursuant to 401 KAR 61:015, Section 5(1), sulfur dioxide emissions shall not exceed 1.4 lb/MMBtu based on a twenty-four hour average.

The following emission units only emit fugitive VOC emissions and do not have any applicable regulations:

Emission Unit 03 (02001 and 03001) Fermentation Process

Grain from scale bins is fed into mash cookers along with water where the grain starches are converted to sugars by a heating process known as "mashing'. The cooked grain/water mixture is fed into fermenter vessels (02001) as a batch operation to convert the sugars to ethanol. The mixture is then distilled and the remaining grain/water is known as "spent stillage". The remaining alcohol in the spent stillage is emitted at fugitive VOC from the spent stillage tanks (03001). The fermentation vessels can process 9.8 ton/hr and the stillage vessels can process 264 ton/day.

Emission Unit 05 (04001, 05001, 06001) Barrel Filling, Aging and Dumping

Condensed liquid from the distillation process is put into barrels, aged and then the resulting whiskey or bourbon is dumped from the barrels to be processed and bottled. The barrel filling stations can process about 1,314,000 barrels per year, the aging warehouse has a capacity of 548,976 barrels and dumping the barrels into storage tanks has a capacity of 1,953,480 barrels per year.

Emission Unit 06 (07001, 08001-08006, 09001) Storage Tanks and Bottling Operation

After the whiskey or bourbon is dumped from the barrels it is stored in 45 storage tanks with a capacity of 1,440,922 gallons per year. When the whiskey or bourbon is ready to be shipped it is bottled at six bottle-filling lines at up to 15,238 gallons per hour. This unit also includes VOC emissions from leaks at about 300 valves, 40 seal pumps, and 500 fittings.

Emission Unit 10 (12001) Wastewater Treatment Process

The wastewater treatment system for the facility processes 33,400,000 gallons/yr.

EMISSION AND OPERATING CAPS DESCRIPTION:

To preclude applicability of 401 KAR 51:017, Prevention of significant deterioration, source-wide sulfur dioxide emissions shall not exceed 225 tons per year based on a twelve (12) month rolling total.

To preclude applicability of Section 112(j) of the Clean Air Act, source-wide emissions of a single hazardous air pollutant (HAP), shall not exceed 9.0 tons any consecutive twelve-month period.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.